J. Product. & Dev., 23(2): 215- 234 (2018)

THE EFFECT OF MAIZE (*Zea mays*, L.) HYBRIDS, NITROGEN SOURCE ANDBIO- FERTILIZER LEVELS ON YIELD AND ITS COMPONENTS AND YIELD ANALYSIS UNDER MID DELTA REGION CONDITIONS

Abd-Elwahab, M.A.; Gaballah, A.B; A.A.Mansour and Nagwa A. Abo-ELkhair

Plant Production Dept., Faculty of Tech. &Dev., Zgazaig Univ., Egypt.

ABSTRACT:

The objective of the present study was evaluation for the effects of maize hybrids (SC 166, SC 176 and TWC 352) all of them are yellow grains, different nitrogen fertilizer sources (ammonium sulphate, ammonium nitrate and urea) and bio-fertilizer levels (0, 250 and 500 gm. Cerealin/ fad.) on growth, yield and its components and yield analysis. To assess the various treatment effects on grain yield and other morphologic traits, two field experiments were conducted in a private farm at one of the villages of Zefta District, Gharbiya Governorate, Egypt during 2014 and 2015 summer seasons.

The experimental design was set up as split-split plot in a randomized complete block with three replications. Maize hybrids and nitrogen sources consider as main and sub plots respectively, under three bio-fertilizer levels as sub sub plots. Maize hybrids had a significant effects (P< 0.01) on the grain yield in both seasons, but not on the number of rows/ear.

While the highest grain yield was obtained from planting SC166, planting SC176 gave the highest ear length, number of grains/row, number of grains/ear , shelling percentage, grain weight/ear and Oil percentage. Nitrogen sources affected significantly (p< 0.01) almost of grain yield and except shelling % its components in both seasons, were ammonium sulphate gave the highest grain yield/fad. compared to the other two forms of nitrogen. Increasing bio-fertilizer levels up to maximum level increased significantly grain yield and all of the yield components, except both shelling percentage and oil percentage, where the differences among bio-fertilizer levels in these traits were not significant.

The combined data across the two growing seasons showed that the ear length, number 0f grains/row, number of grains/ear, shelling *percentage, grain weight/ear, 100-grain weight and straw and biological yield/fad. had positive and significant relationships with grain yield/fad. These results imply that most of these traits contribute to increase in grain yield.*

Thus, they also form critical traits for maize improvement. Further, oil percentage showed a negative relation with grain yield/fad. path analysis study showed that the direct effect of number of row/ear was 69.11% of maize grain yield variation, while the direct effects of number of grains/row and 100-grain weight were 3.44 and 3.85% of grain yield variation, respectively.

Key words: Maize hybrids, nitrogen sources, bio-fertilizer, Crerealin, shelling percentage, path analysis.

INTRODUCTION

The crop belonged to this study is Maize (*Zea mays,* L.). It is consider as a major cereal crop either in Egypt or in the world, it occupies the third most important ceral after both wheat and rice. Thus, maize grains are widely used for human and animal feeding, also are used as a raw material for many industrial products.

Maize hybrids differ in their yielding abilities depending on the genetic make up as well as its interactions with the environemental factors. Many researchers tested avarious maize hybrids and found significant differences among them (Mansour and Abd EL-Mksoud, 2009; Khaksar *et al.*, 2009; Abd EL-Maksoud and Mansour, 2010, Iqbal *et al*., 2013; Amin and Vahid, 2015; Amal *et al.,* 2016 and Safa *et al.,* 2016).

Maize productivity, in terms of growth, yield an yield components, varies widely depending on various environmental factors such as temperature, rainfall distribution, some agronomic practices like nitrogen sources and doses. Amin and Hamidreaza (2015) reported that N-fertilizer (Nitroxin Nitrokara and *Azot barvar* L) N-fertilizer had a significant on all studied traits instead of number of row per cob and harvest index. Amal *et al.* (2016), found highly significant differences due to N-sources in maize yield and its components except, harvest index and shelling percentage. Dilip and Bao (2016) indicated that the effect of nitrogen sources on maize yield .was in consistent in the two years of experimentation.

Therefore, an adequate supply of nitrogen source and type is essential to maximize yield could be achieved by following the new trends in maize development and production such as bio-fertilizer used beside the chemical fertilizer to decrease the amount of it as well as improvement maize production through several components of yield. Abd-Alla (2005) studied the influence of four bio-fertilizers namely: Nitrobin, Microbin, mixture of Nitrobin + Microbin and control on maize potentiality under drip irrigation regimes in newly reclaimed soil. He indicated that the effect of bio-fertilizers on maize grain yield and its components was significant and cold be arranged as: the mixture of both bio-fertilizers, Microbin, Nitrobin and check treatment were gave the highest values of plant height, ear height, ear length, 100-grain weight, number of rows/ear, number of grains/ear, grain yield/plant and grain yield/fad. when plants treated with bio-fertilizers in a descending order.

Many workers found significant differences in more of maize yield and its components due to bio-fertilizers.

Therefore, this study was performed in order to determine the optimum nitrogen source and bio-fertilizer level for three maize hybrids.

MATERILS AND METHODS

The present work was carried out at a private farm, Dahtora Village, Zefta District, Gharbeya, Governorate, Egypt during 2014 and 2015 summer seasons .

This study aimed to investigate the effect of nitrogen sources viz., ammonium sulphate (20.6%N), ammonium nitrate (33.5%N) and urea (46%N), as well as bio-fertilizer levels (0, 250, and 500 gm. Cerealin/fad.

On growth, yield and its components and yield analysis of three maize hybrids *i.e.* SC 166, SC 176, and TWC 352.

Prior to sowing, grain inoculation was carried out using the bio-fertilizer cerealin (produced by Ministry of Agriculture, Egypt). The N2-fixer inoculation efficient nitrogen fixing strings of *Azosprillum lipoferum* and *Bacillus polymax*. Inoculation was performed by mixing grains with appropriate amount of cereal in (one gm./100gm. Maize grains) using Arabic gum as adhesive material. The coated grains were then air dried in the shade for 30 minutes and sown immediately.

A split-split plot design with three replications was followed, where maize hybrids occupied the main plots. The three nitrogen sources were allotted to the sub plots, whereas the bio-fertilizer levels were randomly distributed in the sub-sub plots. Nitrogen fertilizer was added in the rate of 90 kg N/fad. of any form of fertilizer in two equal doses, the first on was applied just before the first irrigation and after thinning and the second one was applied just before the second irrigation.

The area of the sub-sub plots was 16.80 m^2 (6x4x0.7)which included 6 ridges. The plant density was /24000 plant/fad. The soil of the experimental fields were clay in texture having a pH 8.36 and 8.16 ; 15.40 and 21.06; 4.28 and 6.18 and 660.03 and 608.5 ppm available N and P and K, respectively.

The preceding crop was wheat in the two seasons Date of sowing was 9/5/2014 and 11/5/2015 in the two growing seasons, respectively. Ordinary superphosphate (15.5% P2 O5) at the rate of 100kg/fad and potassium sulphate (48%K2O) at the rate of 50 kg/fad. were used The prevailing agronomic practices carried out by farmers in the region were kept.

With respect to data recorded, ten guarded plants were taken from the 2nd and 5th ridges in each sub-sub plot, then number of ears/plant , ear length, number of rows/ear, number of grains/row, number of grains/ear, shelling percentage, grain weight/ear and 100-grain weight Grain yield (ton/fad.) which adjusted to 15.5% moisture content was determined from the middle two ridges. At last, grain oil percentage was determined according to Comstock and Culberston (1958).

Analysis of variance and pooled data recorded in the two seasons were followed according to Snedecor and Cochran (1982). The comparison among treatments means was done as described by Duncan (1955). The combined data of yield and its components were subjected to simple correlation and path coefficient according to Svab (1973).

RESULTS AND DISCUSSION

Maize hybrids effect.

Data in Tables 1, 2, 3, 4 and 5 show the effect of maize hybrids , nitrogen sources and bio-fertilizer levels on number of ears/plant, ear length, number of rows/ear, number of grains/row, number of grains/ear, shelling percentage, grain weight/ear, 100-grain weight, grain yield (ton/fad.) and oil percentage.

Among the three maize hybrids, there were significant differences in almost of studied traits, while number of tows/ear was significantly affected by maize hybrids in the second season as the combined. The single cross 176 was superior in the most characters in this study than the other two maize hybrids. In both seasons, SC 176 out yielded significantly in all the studied yield attributes, except 100-grain weight and grain yield/fad. The superiority of SC 176 in almost grain yield components may be due to its growth vigor, However, both SC 166 and TWC 352 were had the same values of number of ears/plant.

Table (1) Number of ears/plant and Ear length (cm) as affected by maize hybrid, nitrogen sources and bio-fertilization levels.

Main effects & interactions	Number of ears/plant			Ear length(cm)		
	Season 2014	**Season 2015**	**Combined**	**Season 2014**	**Season 2015**	**Combined**
Maize hybrids (H) :						
SC166	1.13 a	1.10 a	1.12 a	22.54 b	22.32 b	22.43 b
SC176	1.01 b	1.01 c	1.01 b	22.79 a	22.85 a	22.82 a
TWC	1.11 a	1.09 b	1.10 a	19.12 c	18.87 c	18.99 c
F-test	**	**	**	**	**	**
Nitrogen Source (N) :						
Ammonium sulphate 20.6%	1.12	1.08 a	1.10 a	21.89 a	21.73 a	21.81 a
Ammonium nitrate 33.5%	1.07	1.07 ab	1.07 b	21.51 b	21.30 b	21.40 b
Urea 46%	1.05	1.06 b	1.06 b	21.06 c	21.02 c	21.04 c
F-test	**N S**	*	**	**	**	**
Biofetilizer (Cerealin) levels(B) :						
0 gm/ fad	1.04 b	1.05 c	1.05 b	19.97 c	19.88 c	19.92 c
250 gm/fad	1.07 b	1.07 b	1.06 b	21.71 b	21.59 b	21.65 b
500 gm/fad	1.15 a	1.09 a	1.12 a	22.79 a	22.58 a	22.68 a
F-test	**	**	**	**	**	**
Interactions :						
H X N	N S	N S	N S	N S	N S	*
H X B	N S	**	*	*	**	**
N X B	N S	N S	N S	N S	*	*

These results are harmony with those oblained by Iqbal *et al.*(2013), Amal *et al.*(2016) and Safa *et al.* (2016). According to the data of studied traits under the effect of nitrogen forms (Tables 1,2,3,4 and 5), it is worthy to observe that the differences between the nitrogen sources take the same trend with those of maize hybrids effect. Maize plants received nitrogen fertilizer in the form of nitrogen sulphate produced the highest values of most studied traits followed by those fertilizer with nitrogen in the form of Amin and Hamidreaza (2015), Amal *et al.*(2016) and Hashim (2016).

Ammonium nitrate, which surpassed the other two hybrids in shelling percentage. However, plants fertilized with urea could not reach the top in any studied characters. These results are in good agreement with those reported by khan *et al.*(2008), Iqbal *et al.* (2013), Amin and Hamidreaza (2015), Amal *et al.*(2016) and Hashim (2016).

Table (2) Number of rows/ear and Number of grains/row as affected by maize hybrid, nitrogen sources and bio-fertilization levels.

Main effects & interactions	Number of rows/ear			Number of grains/row		
	Season 2014	**Season 2015**	**Combined**	**Season 2014**	**Season 2015**	**Combined**
Maize hybrids (H):						
SC166	14.26 b	15.19	14.73	48.03 a	47.31b	47.67 b
SC176	14.51 a	14.38	14.44	48.22 a	48.46 a	48.34 a
TWC	14.05 c	13.81	13.93	40.74b	39.95c	40.34 c
F-test	**	N S	N S	**	**	**
Nitrogen Source (N):						
Ammonium sulphate 20.6%	14.41 a	14.27	14.34	46.33 a	46.02a	46.17 a
Ammonium nitrate 33.5%	14.27 b	15.14	14.70	45.81 a	45.15b	45.47 b
Urea 46%	14.15 c	13.96	14.06	44.86b	44.55 c	44.71 c
F-test	**	N S	N S	**	**	**
Biofetilizer (Cerealin) levels(B):						
0 gm/ fad	13.71 c	13.53b	13.62 b	42.19 c	42.07 c	42.13 c
250 gm/fad	14.10 b	14.01b	14.06 b	46.23b	45.77b	46.00 b
500 gm/fad	15.00 a	15.83a	15.42 a	48.57 a	47.87 a	48.22 a
F-test	**	*	**	**	**	**
Interactions :				N S		
H X N	N S	N S	N S	*	N S	N S
H X B	**	N S	N S	N S	**	**
N X B	N S	N S	N S	N S	*	*

Bio-fertilizer levels effect

Application of cerealin as bio-fertilizer resulted in a significant increase in all of tested traits up to 500 gm cerealin/fad. Tables (1, 2, 3, 4 and 5). However, the increase in cerealin level up to 500 gm/fad. caused a significant decrease in both shelling percentage and oil content. The increases in grain yield of maize resulted form the applied nitrogen fixed by cerealin, which improved plant growth and increased yield components. Similar results were obtained by Sayed *et al.* (2002), Hamdy (2003), Abd-Alla (2005), Ali and Samoud (2007), Ragab and Ibrahim (2009), Hassan and Morad (2013), Umesha (2014), Amin and Vahid (2015) and Hashim (2016).

The interaction effect between maize hybrids and bio-fertilizer levels (HxB) on ear length, number of grains/row, number of grains/ear, shelling percentage, 100-grain weight and grain yield (ton/fad.) was significant (Tables 2-a,4-a,5-a,6-a,7-a and 8-a) The study of interaction effect of treatments showed H_2B_3 with ear length of 24.22 and response rate of 23.31; H_1B_3 and $H_2B_3$with number of grains/row of 50.71 and 51.29 and response rate of 6.68 and 6.90; H_2B_3 with number of grains/ear of 777.12 and response rate of 148.7; H_2B_3 with shelling percentage of 82.95 and response rate of 0.58; H_3B_3 with 100-grain weight of 33.29 and response rate of 2.34 and H_1B_3 with grain yield (ton/fad.)of 3.99 and response rate of 1.28 had a significant preference in comparison to other treatments .

Table (2-a). The interaction effect between maize hybrids and bio-fertilizer levels on Ear length (cm)

Bio-fer. \ Hybrids		S.C.166	S.C.176	T.W.C.352
0	**gm/fad**	B 20.72 c	A 21.11 c	C 17.92 c
250	**gm/fad**	B 22.71 b	A 23.22 b	C 19.02 b
500	**gm/fad**	B 23.86 a	A 24.22 a	C 20.04 a
Response	**rate**	**3.14**	**3.11**	**2.12**

Table (4-a) The interaction effect between maize hybrids and bio-fertilizer levels on Number of grains / row in the combined

Bio-fer. \ Hybrids		S.C.166	S.C.176	T.W.C.352
0	**gm/fad**	A 44.03 c	A 44.39 c	B 37.96 c
250	**gm/fad**	A 48.26 b	A 49.33 b	B 40.41 b
500	**gm/fad**	A 50.71 a	A 51.29 a	B 42.65 a
Response	**rate**	**6.67**	**6.90**	**4.69**

Table (5-a). The interaction effect between maize hybrids and bio-fertilizer levels on Number of grains / ear in the combined

Hybrids / Bio-fer.	S.C.166	S.C.176	T.W.C.352
0 gm/fad	B 594.79 c	A 628.33	C 509.69 c
250 gm/fad	B 681.11 b	A 699.93b	C 556.09 b
500 gm/fad	B 760.31 a	A 777.12	C 620.65 a
Response rate	**165.52**	**148.79**	**110.96**

Table (6-a) The interaction effect between maize hybrids and bio-fertilizer levels on Shelling percentage in the combined

Hybrids / Bio-fer.	S.C.166	S.C.176	T.W.C.352
0 gm/fad	B 81.91 a	A 82.95 a	C 79.54 a
250 gm/fad	B 81.65 b	A 82.66 b	C 78.93 b
500 gm/fad	B 81.08 c	A 82.37 c	C 78.12 c
Response rate	**-0.83**	**-0.58**	**-1.42**

Yield analysis

Correlation studies

Evaluating yield components and their interrelation ships as well as detecting suitable selection indices are very important in maize. The simple correlation coefficient is one of the important indicators to study the nature of the correlation between traits for use in crop improvement following appropriate method of selection.

The combined data across the two years (Table 6) showed that number of ears /plant, ear length, number of rows/ear, number of grains/row, number of grains/ear shelling percentage, grain weight/ear, 100-grains weight and oil content have positive and highly significant relationships with grain yield/fad.

Table (7-a) The interaction effect between maize hybrids and bio-fertilizer levels on Weight of 100 grains in the combined

Hybrids / Bio-fer.	S.C.166	S.C.176	T.W.C.352
0 gm/fad	A 2.71 c	B 2.66 c	C 2.34 c
250 gm/fad	A 3.19 b	B 3.03 b	C 2.56 b
500 gm/fad	A 3.99 a	B 3.49 a	C 2.88 a
Response rate	**1.28**	**0.83**	**0.54**

Table (8-a). The interaction effect between maize hybrids and bio-fertilizer levels on Grains yield ton / fad. In the combined

Hybrids / Bio-fer.	S.C.166	S.C.176	T.W.C.352
0 gm/fad	C 30.08 c	B 30.30 c	A 30.95 c
250 gm/fad	C 30.47 b	B 30.81 b	A 31.65 b
500 gm/fad	C 31.84 a	B 32.24 a	A 33.29 a
Response rate	**1.76**	**1.94**	**2.34**

Table (6): Simple correlation coefficients between maize grain yield/fad., yield components and other characters of combined

Character	1	2	3	4	5	6	7	8	9	10	11	12	13
Y-Grain yield/fad.	0.692**	0.9154**	0.7442**	0.683*	0.356	0.663*	0.668*	0.5319*	0.915**	0.538*	0.497	-0.648*	0.437
1-Ear length		0.875**	0.758**	0.885**	0.842**	0.159	0.947**	0.663*	0.904**	0.903**	0.971**	-0.745*	0.46
2-No.of rows/ear			0.811**	0.853**	0.627*	0.578*	0.851**	0.278	0.970**	0.782*	0.744*	-0.805**	0.616*
3-No. of grains/row				0.700**	0.802**	0.272	0.948**	0.577*	0.955**	0.883**	0.927**	-0.972**	0.475*
4-No. of grains/ear					0.803**	0.277	0.953**	0.581*	0.956**	0.890**	0.937**	-0.968**	0.511*
5-Ear yield/fad.						-0.615*	-0.266	-0.678*	-0.595*	-0.033	-0.872**	-0.419	-0.577*
6-Shelling percentage							0.197	0.502*	0.42	-0.175	-0.313	0.374	-0.241
7-Grain weight/ear								0.971**	0.846**	0.654*	0.916*	-0.840**	0.702*
8-100-grain weight									0.849**	0.933*	0.084	0.839**	0.617*
9-Straw yield/fad.										0.973**	0.856**	-0.638*	0.705*
10-Biological yield											0.919**	0.417*	0.296
11-Protein content.												0.194	0.441
12-Oil content.													0.181
13-Starch content.													

The persons coefficients were (0.692**), (0.915**), (0.744**), 0.683**), (0.356), (0.663*), (668*) and (0.532*), respectively. These results imply that most of these traits contribute to increase in grain yield .Thus, they also form critical traits for maize improvement . Further, oil content% showed a negative relation with grain yield /fad. These results are in good agreement with those obtained by Ali (2009) , Amiri *et al.*(2009), Khazaei *et al.*(2010), Muhammed (2010), Batool and Danial (2012) and Nastaran *et al.*(2013).

Path analysis study.

The partitioning of simple correlation coefficient between maze grain yield and its components mentioned herein is presented in Table (7).

Table (7) Partitioning of simple correlation coefficients between grain yield/fad. And its components under different treatments.

Sources	**Combined**
Number of rows/ear:	
Direct effect.	0.7751
Indirect effect via number of grains/row	0.103
Indirect effect via 100-grain weight	0.0373
Total (ry1)	**0.9154**
Number of grain/row:	
Direct effect.	0.3941
Indirect effect via number of rows/ear	0.1465
Indirect effect via 100-grain weight	0.2036
Total (ry1)	**0.7442**
100-grain weight :	
Direct effect	0.3762
Indirect effect via number of rows/ear.	0.04
Indirect effect via number of grains/row	0.1157
Total (ry1)	**0.5519**

The results indicate that number of rows/ear had the highest direct effect on grain yield /fad. (0.7751) followed by number of grain/row (0.3941) and 100-grain weight (0.3762), respectively.

Also, the indirect effect of number of rows/ear via number of grains/row (in two reversal directions is 0.1465 and 0.1030) and through 100-grain weight (0.0373), as well as, the indirect effect of number of grains /row via 100-grain weight (in the two reversal directions is (0.2036 and 0.1157) gave a considerable path coefficient values. However, the indirect effect However, the indirect effect of 100- grain weight via number of rows/ear on grain yield was of low values in this regard (0.04). Again , as mentioned before Table (7), total correlation coefficient was most pronounced in number of rows/ear (r=0.9154) than in number of grains/row (r=0.7442) or in 100-grain weight (r=0.5319).

The relative importance in contributing maize grain yield as recorded in percentage of variation for number of rows/ear , number of grains/row, 100-grain weight and their interaction is presented in Table (8). The path

Table (8). Direct and Joint effects of yield components as percentage of grain yield variation in maize **.**

Yield components	Combined C.D.	%
Number of rows/ear	0.6911	69.11
Number of grain/row	0.0344	3.44
100- grain weight.	0.0385	3.85
Number of rows/ear x number of grains/ear	0.0685	6.85
Number of rows/ear x 100-grain weight	0.0551	5.51
Number of grains/row x 100-grain weight	0.0372	3.72
R	0.9248	92.48
Residual	0.0752	7.52
Total	1	100

analysis revealed that the direct effect of number of rows/ear was 69.11% being higher lhan number of grains/row and 100-grain aeight which was 3.44 and 3.85% of the variation, respectively.

Here, it is worthy to observe hat those traits *i .e.* number of rows/ear, number of grains/row and 100-grain weight could contributed much in maize grain yield since R^2 was 92.48% of the total variation in maize grain yield . Also, it is interesting to note that the residual effects contributing to grain yield in this study was low in magnitude being 7.52%. These results are in accordance with the findings of Agrama (1996), Ali (2009) , Amiri *et al.*(2009), Khazaei (2010), Manal (2011), Batool and Daniel (2012) and Nastoran *et al.*(2013).

Conclusively,

REFERENCES

Abd-Alla , A . A. (2005) – Maize yield potentiality in responseTo bio and mineral nitrogen fertilizers under drip Irrigation regimes in the newly reclaimed soil . *J. Agric., Sci. Mansoura Univ*., 30 (10): 5765-5779.

Ali Khamis Basibag and SamoudFadl Ali (2007) – Response To the (Zea mays L.) organic , mineral and biological Fertilization II-Effect of fertilization on yield and Yield components . *J. of the mandates of Agric. Sci.* , Machtohor, 45 (2) اين ارقام الصفحات

Amiris ,Nour Mohammadis., Jafari Ali Ashraf, Chougar (2009). Correlation Regression and path analysis for grain yield and yield Components on early maturing hybrids of grain corn. *Journal Of Agricultural Sciences and natural Resources*, Volume 16, Number 2; 99 - 112.

Ali Nemati$_1$, Mohammad Sedghi , RaufSeyed Sharifi$_3$, Mir Naser Seiedi$_4$ (2009)-Investigation of correlation Between traits and path analysis of corn (Zea Mays L.) grain yield at the climate of Ardabil Region (Northwest Iran) . *Not. Bot. Hort. Agrobot. Cluj*, 37 (1): 194-198.

AbdEL-Maksoud, M. F. andA. A. Mansour (2010) –Phenotypic stability parameters for some single And three way hybrids of maize (Zea mays L.) *Zagazig J. Agric. Res.*, Vol. 37 No (1): اين ارقام الصفحات

Amin Farnia ,Vahid kozemi Ashjardi (2015). Effect of Nitrogen en bio-fertilizers on yield and yield Components of different maize (*Zea* mays L.) Cultivars . *International Journal of Life Sciences* , 9 (5): 117-121.

Amin Farnia , and Hamidreaza Tarkaman (2015) – Effect of Different bio-fertilizers on yield and yield Components of maize (*Zea mays* L.) bulletin of Environment pharmacology and life Sciences Bull Env., *Pharmacol Life Sci*. , Vol. 4 (4) March 2015 :75-79

Amal, G. Ahmed , Nabila , M . Zaki, M. S. Hassanein , Gehan Sh. Bakhoum and M .M. Tawifk (2016). Influence Of nitrogen fertilizer sources on yield and its Components of some maize varieties . *Research Journal Of Pharmaceutical, Biological And Chemical Sciences* ,7 (4) :1005-1011.

Batool Zarei , Dnial Kahrizi , Alireza Pour Aboughadareh and Farhad Sadeghi (2012). Correlation and path Coefficient analysis for determining interrelationships Among grain yield and related characters in corn Hybrids (*Zea mays* L.) . *International Journal of Agriculture and Crop Sciences*. Available online at www. Ijagcs. Com IJACS/2012/4-20/ 1519-1522.

Comstock, V.E. and Culberston, J.O. (1958) A rapid method ofdetermining the oil content and ioding Values. *Agron. J*., 50 (1), 113-114

Duncan ,B. D. (1955)-Multiple range and Multiple f. test Biometrics 11: 1-52

Dilip K. Biswas, Bao-Luo Ma (2016)- Effect of nitrogen **rate** And fertilizer nitrogen source on physiology , yield , Grain quality , and nitrogen use efficiency in corn . Canadian Journal of plant Science ,2016 96 (3) :392- 403, 10. 1139/cjps-2015- 0186

F . Khazaei, M. Agha Alikhani , L. Yari and A . Khandan (2010) – Study the Correlation , Regression and path Coefficient Analysis in Sweet Corn (Zea mays var. Saccharata) Under Different Levels of Plant DensityAnd Nitrogen Rate. November 2010, ISSN 1990-6145 ARPN **,** *Journal of Agricultural and Biological Science*, Vol. 5 ,No.6, اين ارقام الصفحات

Hamdy Wahba Ahmed Wahba(2003) – Response of some High - yielding Maize Cultivars to Mineral and Bio-Nitrogen Fertilization . PhD Thesis Agriculture Mishtohr Zagazig University, Branch Banha.

H . Z . Khan , M . A . Malik and M . F . Saleem (2008) – Effect of rate and source of organic Material on theProduction potential of spring maize (*Zea mays* L .). *Pak. J. Agric. Sci.* , Vol. 45 (1) ,2008

Hassan Beyronvond , Amin Farnia , ShahromNakhjavan , And Morad Shaban (2013). Response of yield and Yield components of maize (*Zea mayz* L.) to different Bio-fertilizers. *International Journal of Advanced Biological and Biomedical Research*, Volume , ISSUE 9 , 2013 : 1068- 1077

Hashim A. Fadlalla, Hatim A.A. Abukhlaif and Somaya S. Mohamed* (2016)- Effects of chemical and bio-fertilizers on yield, yieldComponents and grain quality of maize (*Zea mays* L.). *AJAR African Journal of Agricultural Research Full Length Research*, Vol. 11 (45), 10 November, 2016, pp. 4654-4660

Iqbal[1*] , H . Z . Khan, Ehsanullah, N . Akbar , M .S . I . Zamir H . M . R . Javeed (2013) –Nitrogen Management Studies in Maize (*Zea mays* L.) Hybrids . *Cercetari Agronomice in Moldova*, Vol. XLVI ,No , 3 (155)/2013 .39-48.

K .Khaksar, R. Chookan ,H. Heidari-Sharifabad, J. Daneshian[c] F. Khazaei, and F. Farhadi (2009) –Study of grain Yield and its components in corn hybrids in twoPlanting dates using different rates of bio-fertilizersIn karaj region. *Iran plant Eco physiology*, 3: 141-150

Mansour A. A. and M. F.AbdEL-Maksoud (2009)- Response Of some maize hybrids to nitrogen fertilizer levels Under cultivated sandy soils . *J . Agric. Sci. Mansoura Univ*. ,34 (4): 3335-3347 , 2009

Muhammad Rafiq, Muhammad Rafique, Amer Hussain and Muhammad Altaf (2010). Studies on Heritability, Correlation and path Analysis in maize (*Zea mays* L.) Heritability, Correlation and path Analysis in maize. J. Agric. Res., 48 (1) اين ارقام الصفحات

Manal Hefny (2011) – Genetic Parameters and Path Analysis Of Yield and its Components in Corn Inbred Lines *(Zea mays* L.) at Different Sowing Dates. *Asian Journal of Crop Science* , 3: 106-117.

Nastaran Rashidi , Ahmad Reza Golparvar*, Mohammad Reza Naderi, Homayoon Darkhal (2013)-Evaluation Of attributes association and path coefficients for Ear yield in maize hybrids (*Zea mays* L.). *International Journal of Farming and Allied Sciences*, 2013 IJFAS Journal 2013-2-22/1033-1036 ISSN2322-4134

Ragab , A. Y. and M. H. Ibrahim (2009) – Effect of nitrogen Phosphorus and bio-fertilizers on maize . II- yield and Its components . *J. Agric. Sci. Mansoura Univ*., 34 (7) :8043-8054, 2009

Svab, J. (1973) – Biometril Modszerek Akutatsban MezogAzdasagikiado ,Budapest/**Snedecor, G. W. and W. G. Cochran (1982)-** Statistical Methods.6[th] ed lowa state Univ. Press Ames lwoa, USA

Safa Ahmed Obid ,Atif ELSadigIdris ,BadrELdinAbdELGadir Mohamed Ahmed (2016) . Effect of bio Fertilizer on Growth and Yield of Two Maize (*Zea mays* L.). *Sch. J. Agric. Sci.*, 3 (4): 313-317.

Umesha, S. Divya M , PrasannaK. S. ,Lakshmipathi R. N.Sreeramulu K. R. (2014) –Comparative Effect of Organics and bio-fertilizers on growth and yield of Maizs (Zea mays L>) Curr Agric. Res. 2014; 2 (1) doi.: http://dx. *Doi. Org/10. 12944/CARJ*. 2.1. 08.

تأثير هجن الذرة ومصدر النيتروجين ومستويات التسميد الحيوى على المحصول ومكوناتة وتحليل المحصول تحت ظروف منطقة وسط الدلتا

عبدالوهاب محمد الجوهرى - السيد بيوى جاب الله - عبدالغنى عبدالمعطى منصور- نجوى احمد ابو الخير
قسم الانتاج النباتى- كلية التكنولوجيا والتنمية - حامعة الزقازيق- مصر.

الهدف من اجراء الدراسة الحالية هو تقييم تأثير هجن الذرة (الهجين الفردى 166؛ 176 الهجين الثلاثى 352) وكلهم ذات حبوب صفراء ،تختلف مصادر النيتروجين (سلفات الامونيوم 20.6 % ،نترات الامونيوم 33.5% ،يوريا 46%) مستويات التسميد الحيوى (صفر؛ 250 ؛ 500 جم/فدان على النمو والمحصول ومكوناتة وتحليل المحصول للذرة الشامية

للوقوف على تأثير مختلف المعاملات على محصول الحبوب وصفات مورفولوجية اخرى فقد اقيمت تجربتين بأحد المزارع الخاصة بقرية دهتورة مركز زفتى محافظة الغربية مصر خلال موسمى 2015/2014 .وكان التصميم التجريبى هو القطعة المنشقة مرتين فى قطاعات كاملة العشوائية بثلاث مكررات. قد وضعت الهجن فى القطعة الرئيسية ومصادر النيتروجين فى القطعة الاولى .تحت ثلاثة مستويات من التسميد الحيوى فى القطعة المنشقة الثانية.

كان لهجن الذرة تأثيرات معنوية على محصول الحبوب فى الموسمين لكن ليس على عدد السطور بالكوز بينما كان اعلى محصول حبوب تم الحصول علية من زراعة هجين فردى 166 اما بالنسبة للهجين الفردى 176 فقد اعطى اعلى طول للكوز ؛عدد الحبوب/السطر ؛عدد حبوب/كوز؛ ونسبة التفريط ؛وزن حبوب الكوز؛نسبة الزيت.

اثر مصدر النيتروجين معنويا على معظم محصول الحبوب ومكوناتة فى الموسمين بأستثناء نسبة التفريط حيث اعطى سلفات الامونيوم اعلى محصول حبوب/فدان بالمقارنة بالصور الاخرى للنيتروجين . زيادة مستويات التسميد الحيوى حتى المستوى الاعلى ادى الى زيادة معنوية فى محصول الحبوب وكل مكونات المحصول بأستثناء نسبة التفريط ونسبة الزيت حيث كانت الاختلافات فيما بين المستويات للتسميد الحيوى فى هذة الصفات لم تكن معنوية.

اوضحت بيانات التحليل التجميعى ان طول الكوز؛ وعدد الحبوب /السطر؛ وعدد الحبوب/الكوز؛ ونسبة التفريط ؛ وزن حبوب الكوز؛ وزن 100 حبة؛ ومحصول كلا من القش والمحصول البيولوجى للفدان وكانت تمتلك علاقة موجبة ومعنوية لمحصول الحبوب للفدان هذه النتائج يستخلص منها ان معظم هذه الصفات تميل الى الزياده فى محصول الحبوب هكذا فأنها ايضا تكون ما يعرف بالصفات الحرجه لتحسين الذره.وفوق ذلك فأن نسبة الزيت اوضحت علاقه سالبة مع محصول الحبوب للفدان .

التوصية: اوضحت دراسة معامل المرور ان التأثير المباشر لعدد السطور فى الكوز كان 69.11 % من تباين محصول الحبوب للذرة فى التأثير المباشر لعدد الحبوب فى السطر ووزن 100 حبة كان 3.44% .؛ 3.85% من تباين محصول الحبوب للذرة على التوالى.